There may be cases where the actual originating network (e.g., wireless) designates another network to act as the ON as described in the options that follow . In those cases, all 1+ and 0+ non-geographic traffic would be routed to the network acting as the ON.

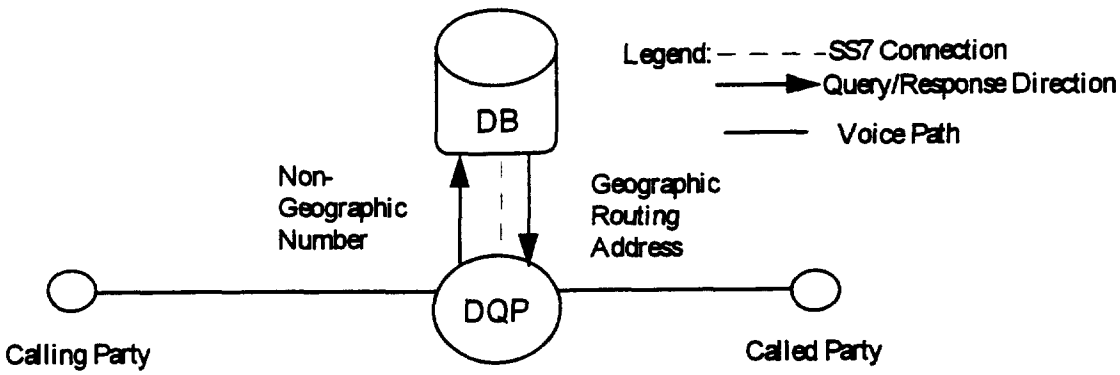


Figure 7: Generic Routing Model

7.2 Routing Scenario Considerations

This section contains routing scenario considerations .

The figures (7.3.1 through 7.3.11) together with the associated tables illustrate the various routing scenarios for the non-geographic number and outline the division of functionality provided by the originating network (ON), intermediate network (IMN) and the terminating network (TN). The routing scenarios are accomplished by use of switch translations and/or a database query.

The signaling information (parameters) passed between networks as shown in the routing scenarios is contained in an SS7 Initial Address Message (IAM). ANSI T1.113-1995 should be consulted for a detailed explanation of the parameters and their use.

Depending on the translation option and network capabilities, some of the information parameters contained in the IAM that may pass from the ON to an IMN or TN are illustrated below. The table lists the parameters, of significance to the routing scenarios (not necessarily all parameters), that may be passed. The IAM illustrated with each scenario contains only those parameters required for the particular scenario. There are other parameters related to routing, not illustrated in this document, that may be used where network capabilities permit.

Table 7

SS7 IAM Parameters

Called Party Number
Calling Party Number
Carrier Identification Code
Charge Number
Generic Address
Jurisdiction Information
Originating Line Information
Original Called Number

The Jurisdiction Information Parameter (JIP) contains an NPA NXX that identifies the geographic location from which a call originates. This information may be useful to other networks (e.g., IMN, TN) for billing/rating purposes when calls originate from wireless users in which neither the calling party number nor the charge number (ANI) represent the geographic location of the origination of the call (e.g., roamer originations).

The SS7 Charge Number Parameter (CNP) and Originating Line Information Parameter (OLIP) are included in possible information flows for all the routing scenarios discussed below, including intraLATA routing. In a called party pays environment, these parameters may be needed for billing and billing screening functions; they may also be needed in scenarios where more than one end user is paying for a portion of the call.

When a non-geographic call originates from an end office that is not equipped with SS7 functionality, the call must be sent forward using MF signaling, to an SS7 equipped office. The originating office will perform a switch translation of the dialed number to acquire the routing information necessary to route the call forward to the SS7 equipped office. The MF signaling information sent forward is described in Table 6.1.

7.3 Routing Scenarios

This section contains examples of possible routing scenarios:

7.3.1 Originating Network (ON) is both the DQP and the Terminating Network (TN). There is no Intermediate Network (IMN).

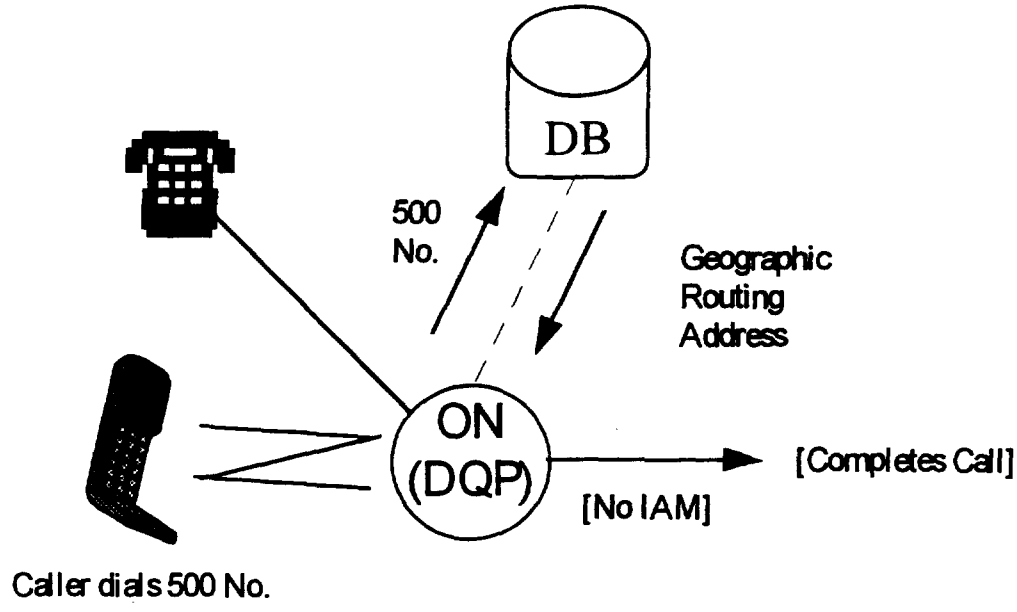
The ON queries the database and routes the call. No IAM between networks is required as the ON is the TN. The assumption in this diagram is that call detail recording for end user billing is performed in this network in order to display the called number on the end user's bill.

TABLE 7.3.1

Originating/Terminating Network
Performs translation and determines ON is DQP
Queries DB and receives geographic routing address[1]
Completes call

[1] Geographic routing address may be the actual NANP number of the non-geographic user at their present location or the network address of the terminating switch that will provide additional call processing.

Figure 7.3.1
Originating Network (ON) is both the DQP and the Terminating Network (TN). There is no Intermediate Network (IMN)



7.3.2 Originating Network (ON) is the DQP and there is no Intermediate Network (IMN).

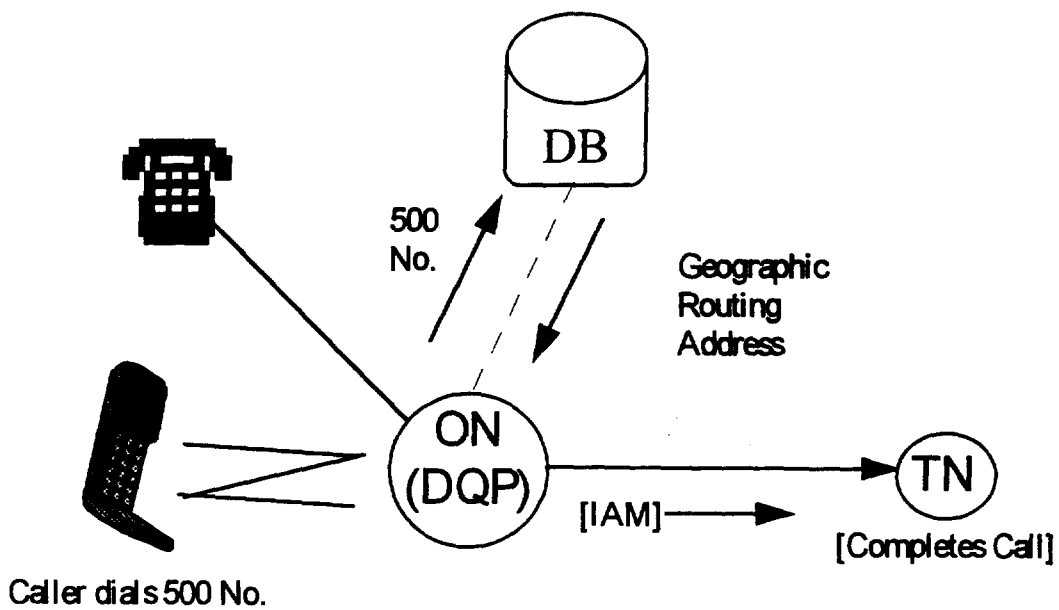
The ON queries the database, retrieves the routing information, sends an IAM with the signaling information parameters, and passes the call to the applicable terminating network. The assumption in this diagram is that call detail recording for end user billing is performed in the ON in order to display the dialed number on the end users' bill.

Table 7.3.2

Originating Network	Terminating Network
Performs translation and determines ON is DQP	–
Queries DB and receives geographic routing address[1]	–
Routes call to the TN	Completes call

[1] Geographic routing address may be the actual NANP number of the non-geographic user at their present location or the network address of the terminating switch that will provide additional call processing.

Figure 7.3.2
Originating Network (ON) is the DQP
and there is no Intermediate Network (IMN)



Information Parameter	IAM Example
Called Party Number	404-987-XXXX
Calling Party Number	213-223-XXXX

Note: The SS7 IAM parameters shown are the minimum set technically required for call routing and/or billing and may be subject to business arrangements.

7.3.3 Originating Network (ON) is the DQP. Call routes through an IMN to the TN.

The ON queries the database, retrieves a CIC[2] (to determine IMN) and routing address and routes the call to the IMN. The IMN routes the call to the TN using the routing address which is contained in the IAM. The assumption in this diagram is that call detail recording for end user billing can be performed in the ON or IMN when appropriate business arrangements exist to use the GAP and JIP (Generic Address Parameter and Jurisdiction Information Parameter) to forward the 500 number between networks. Modifications of the information provided in the GAP would be required.

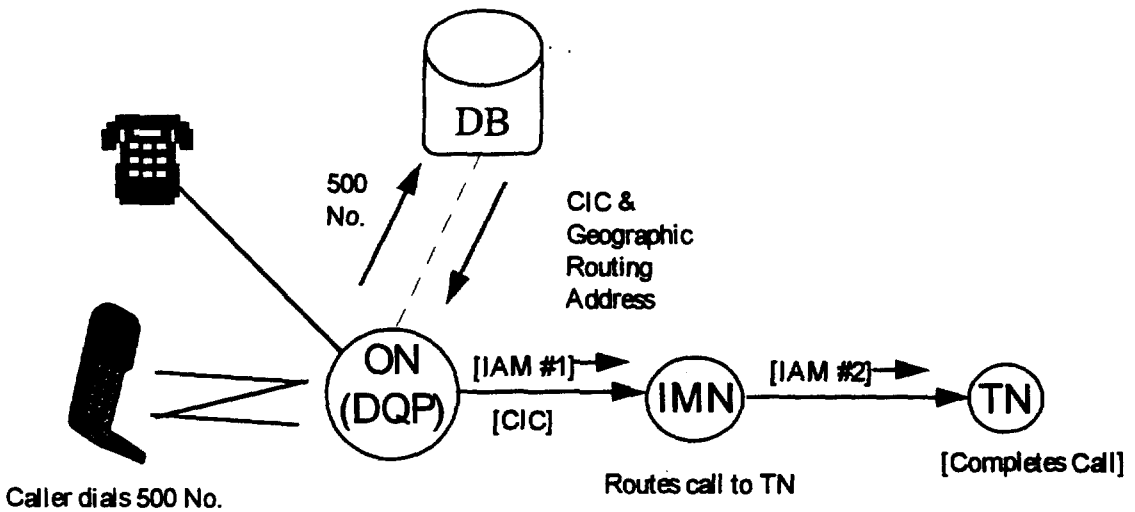
Table 7.3.3

Originating Network	Intermediate Network	Terminating Network
Performs translation and determines ON is DQP	-	-
Queries DB and receives CIC[2] and geographic routing address[1]	-	-
Routes call to the IMN identified by CIC[2]	Routes call to TN using geographic routing address	Completes call

[1] Geographic routing address may be the actual NANP number of the non-geographic user at their present location or the network address of the terminating switch that will provide additional call processing.

[2] "CIC" allows for the DB to return CIC associated with the non geographic number or a "Use PIC" indicator that instructs the ON to use the calling party's PIC for routing.

Figure 7.3.3
Originating Network (ON) is the DQP.
Call routes through an IMN to the TN



Information Parameter	IAM #1 Example	IAM #2 Example
Called Party Number	404-987-XXXX	404-987-XXXX
Charge Number	212-223-XXXX	212-223-XXXX
Originating Line Information	00 or 62	00 or 62
Calling Party Number	212-223-XXXX	212-223-XXXX
Jurisdiction Information	415-234	
Generic Address	500-234-XXXX	

Note: The SS7 IAM parameters shown are the minimum set technically required for call routing and/or billing and may be subject to business arrangements.

7.3.4 Terminating Network (TN) is the DQP. The ON routes call to TN using the Trunk Group Identification (TGID). There is no IMN.

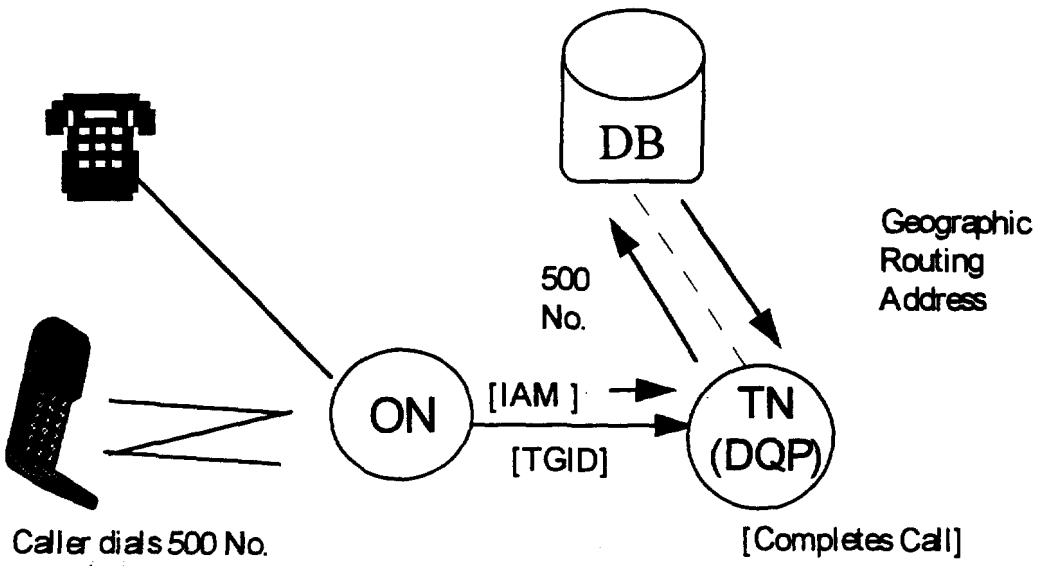
The ON routes the call to the TN using a TGID. The TN queries the database, retrieves the geographic routing address and routes the call. The assumption in this diagram is that call detail recording for end user billing could be performed in the TN.

Table 7.3.4

Originating Network	Terminating Network
Performs 6-digit translation to identify the TGID	Holds call, queries DB and receives geographic routing address[1]
Routes call to TN using TGID	Completes call

[1] Geographic routing address may be the actual NANP number of the non-geographic user at their present location or the network address of the terminating switch that will provide additional call processing.

Figure 7.3.4
Terminating Network (TN) is the DQP.
The ON routes call to TN using the
Trunk Group Identification (TGID).
There is no IMN.



Information Parameter	IAM Example
Called Party Number	500-234-XXXX
Charge Number	212-223-XXXX
Originating Line Information	00 or 62
Calling Party Number	212-223-XXXX
Jurisdiction Information	415-234

Note: The SS7 IAM parameters shown are the minimum set technically required for call routing and/or billing and may be subject to business arrangements.

7.3.5 Terminating Network (TN) is the DQP. ON routes to the TN using the CIC. There is no IMN.

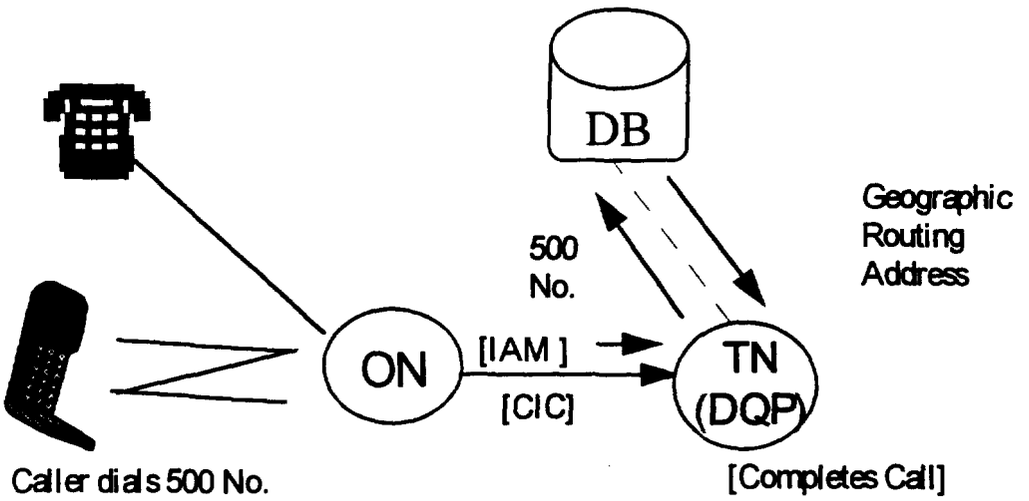
The ON routes the call to the TN using a CIC obtained from a 6-digit translation of the non- geographic number. The TN queries the database, retrieves the routing address and completes the call. The assumption in this diagram is that call detail recording for end user billing is performed in the ON. The geographic routing address is not available to the ON.

Table 7.3.5

Originating Network	Terminating Network
Performs 6-digit translation to identify the CIC	Holds call, queries DB and receives geographic routing address[1]
Routes call to TN identified by CIC	Completes call

[1] Geographic routing address may be the actual NANP number of the non-geographic user at their present location or the network address of the terminating switch that will provide additional call processing.

Figure 7.3.5
Terminating Network (TN) is the DQP.
ON routes to the TN using the CIC.
There is no IMN.



Information Parameter	IAM Example
Called Party Number	500-234-XXXX
Calling Party Number	212-223-XXXX

Note: The SS7 IAM parameters shown are the minimum set technically required for call routing and/or billing and may be subject to business arrangements.

7.3.6 Intermediate Network (IMN) is the DQP with a second IMN and a Terminating Network (TN). ON routes to IMN 1 using a TGID.

The ON routes the call to IMN 1 using a TGID since the ON cannot determine which CIC to use without a data base query because the call may be; 1) intra or interLATA, 2) calling or called party pays. The IMN 1 queries the data base, retrieves the geographic routing address and a USE PIC indicator, or a designated CIC associated with the non-geographic number, which resides in the database, and routes the call to the IMN 2 using the PIC or CIC. In some situations, IMN 2 is selected by the originating party (PIC), and in others, by the terminating party or service provider (designated CIC) based on business agreements and service offerings (i.e. called vs. calling party pays). The IMN 2 routes the call to the TN using the geographic routing address. The TN completes call. The assumption in this diagram is that call detail recording for end user billing could be performed in IMN 1 or 2 based on the IAM details listed below. The information contained in IAM 2 and 3 is based upon business agreements and therefore call detail for end user billing could also be performed in the TN. With the TGID routing, the CIC/PIC is not currently sent from the ON to another network. Sending the CIC/PIC associated with the calling party's line, between networks, when TGID routing is used, would require development of new switch features.

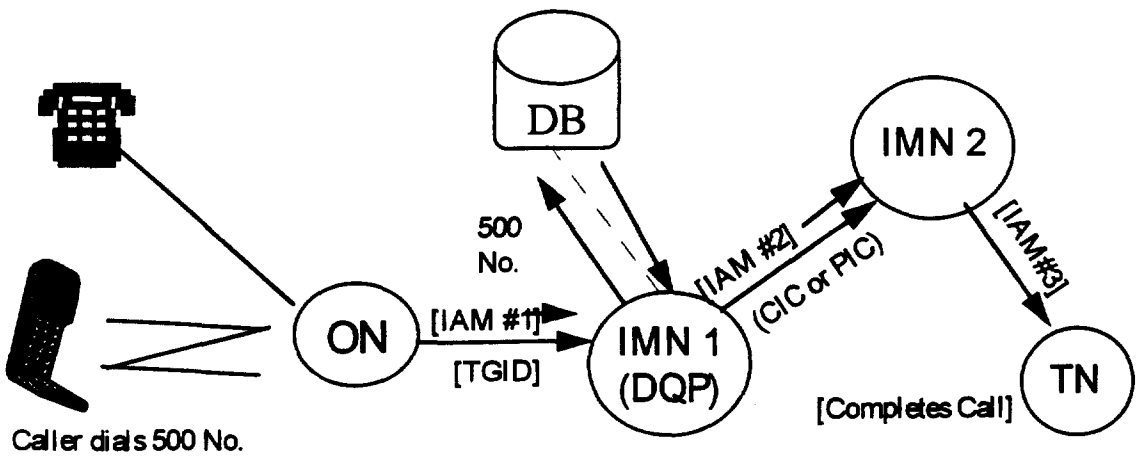
Table 7.3.6

Originating Network	Intermediate Network	Terminating Network
Performs 6-digit translation to identify the TGID	IMN 1 holds call, queries DB and receives CIC[3] and geographic routing address[1]. IMN 1 uses CIC to route call to IMN 2	—
Routes call to IMN 1 using TGID	IMN 2 routes call to TN using IAM #2	Completes call

[1] Geographic routing address may be the actual NANP number of the non-geographic user at their present location or the network address of the terminating switch that will provide additional call processing.

[3] "CIC" allows for the DB to return the CIC associated with the non-geographic number or a "USE PIC" indicator that instructs the IMN to use the calling party's PIC for routing. Protocol changes for a "USE PIC" indicator will be required to provide the PIC to the IMN.

Figure7.3.6
Intermediate Network (IMN) is the DQP with a second IMN and a Terminating Network (TN). ON routes to IMN 1 using a TGID.



Information Parameter	IAM #1 Example	IAM #2 Example	IAM #3 Example
Called Party Number	500-234-XXXX	404-987-XXXX	404-987-XXXX
Charge Number	212-223-XXXX	212-223-XXXX	
Originating Line Information	00 or 62	00 or 62	
Calling Party Number	212-223-XXXX	212-223-XXXX	212-223-XXXX
Jurisdiction Information	415-234	415-234	
Generic Address	Blank Field	500-234-XXXX	
Carrier Identification Code (IntraLATA)	5123		
Carrier Identification Code (InterLATA)	0288		

Note: The SS7 IAM parameters shown are the minimum set technically required for call routing and/or billing and may be subject to business arrangements.

7.3.7 Intermediate Network (IMN) is the DQP. ON routes to the IMN using the CIC.

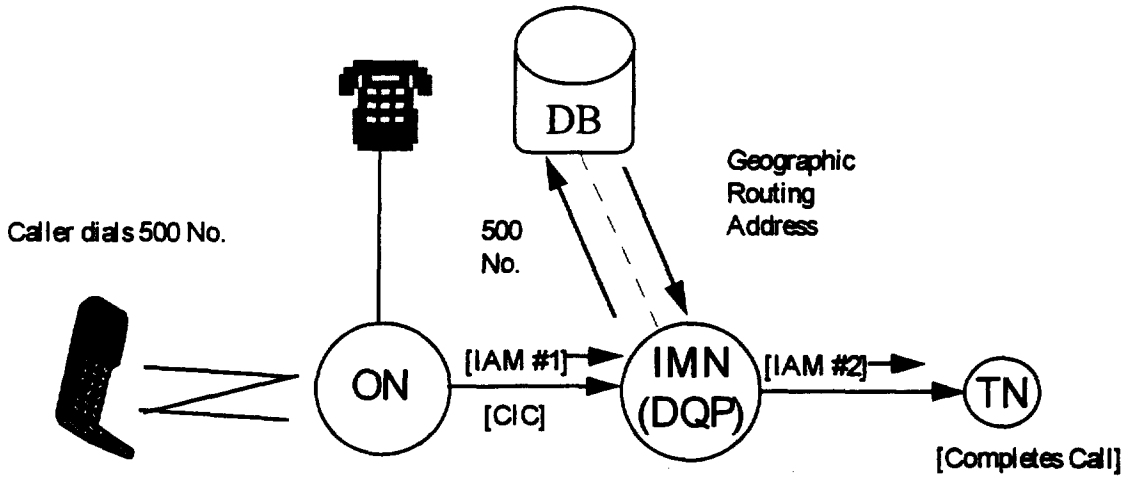
The ON routes the call to the IMN using FG D signaling and a CIC obtained from a 6-digit translation of the non-geographic number. The IMN queries the database and retrieves the geographic routing address and routes the call to the TN. The TN completes the call. With appropriate business arrangements, routing could be performed utilizing the USE PIC indicator. The assumption in this diagram is that call detail recording for end user billing is performed in the IMN.

Table 7.3.7

Originating Network	Intermediate Network	Terminating Network
Performs 6-digit translation to identify the CIC	Holds call, queries DB and receives geographic routing address[1]	Completes call
Routes call to IMN identified by CIC	Routes call to TN	–

[1] Geographic routing address may be the actual NANP number of the non-geographic user at their present location or the network address of the terminating switch that will provide additional call processing.

Figure 7.3.7
Intermediate Network (IMN) is the DQP.
ON routes to the IMN using the CIC.



Information Parameter	IAM #1 Example	IAM #2 Example
Called Party Number	500-234-XXXX	404-987-XXXX
Charge Number	212-223-XXXX	
Originating Line Information	00 or 62	
Calling Party Number	212-223-XXXX	212-223-XXXX
Jurisdiction Information	415-234	

Note: The SS7 IAM parameters shown are the minimum set technically required for call routing and/or billing and may be subject to business arrangements.

7.3.8 Terminating Network (TN) is the DQP. ON routes to the IMN using a TGID, IMN performs translation using the called number.

The ON routes the call to the IMN, using a TGID. IMN performs translation of Called Party Number (e.g., 500 234-XXXX) to geographic number of DQP switch location (e.g., 404 987). The IMN routes the call to the TN . The TN queries the database, retrieves the routing address and routes the call. The assumption in this diagram is that call detail recording for end user billing and the identification of the terminating network node where the DQP is located, is performed in the IMN. The call detail recording for end user billing could also be performed in the TN based on business arrangements.

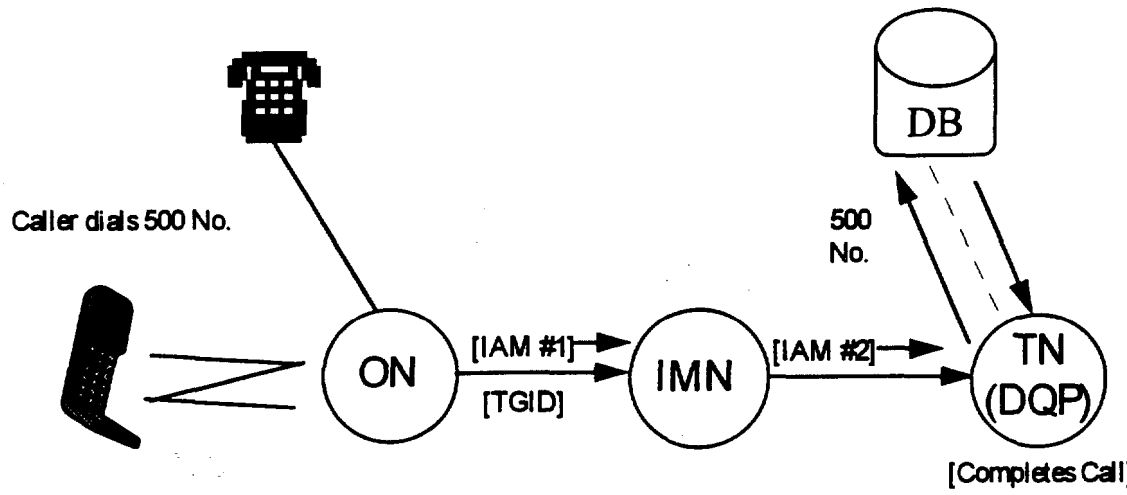
Table 7.3.8

Originating Network	Intermediate Network	Terminating Network
Performs 6-digit translation to identify the TGID	Performs 6-digit translation of the 500 number to a geographic routing address which is the terminating address of the DQP	Holds call, queries DB for geographic routing address[1]
Routes call to IMN using trunk group	Routes call to TN using the terminating address of the DQP	Completes call

[1] Geographic routing address may be the actual NANP number of the non-geographic user at their present location or the network address of the terminating switch that will provide additional call processing.

Figure 7.3.8
Terminating Network (TN) is the DQP.
ON routes to the IMN using a TGID,
IMN performs translation using the called number.

Note: IMN performs translation of Called Party Number (e.g., 500 234-XXXX) to geographic number of DQP switch location (e.g., 404 987).



Information Parameter	IAM #1 Example	IAM #2 Example
Called Party Number	500-234-XXXX	404-987-XXXX (Terminating
Charge Number	212-223-XXXX	address of the DQP)
Originating Line Information	00 or 62	
Calling Party Number	212-223-XXXX	212-223-XXXX
Jurisdiction Information	415-234	
Generic Address	Blank Field	500-234-XXXX

Note: The SS7 IAM parameters shown are the minimum set technically required for call routing and/or billing and may be subject to business arrangements.

7.3.9 Terminating Network (TN) is the DQP. ON routes to the IMN using a CIC. IMN performs translation using the called number.

The ON routes the call to the IMN, using a CIC associated with the non-geographic number . The IMN performs a translation of the Called Party number (e.g., 500 234-XXXX) to the geographic number of the DQP switch location (e.g., 404 987). The IMN routes the call to the TN. The TN queries the database, retrieves the routing address and routes the call. The assumption in this diagram is that call detail recording for end user billing and the identification of the terminating network node where the DQP is located, is performed in the IMN. The call detail recording for end user billing could also be performed in the TN based on business arrangements.

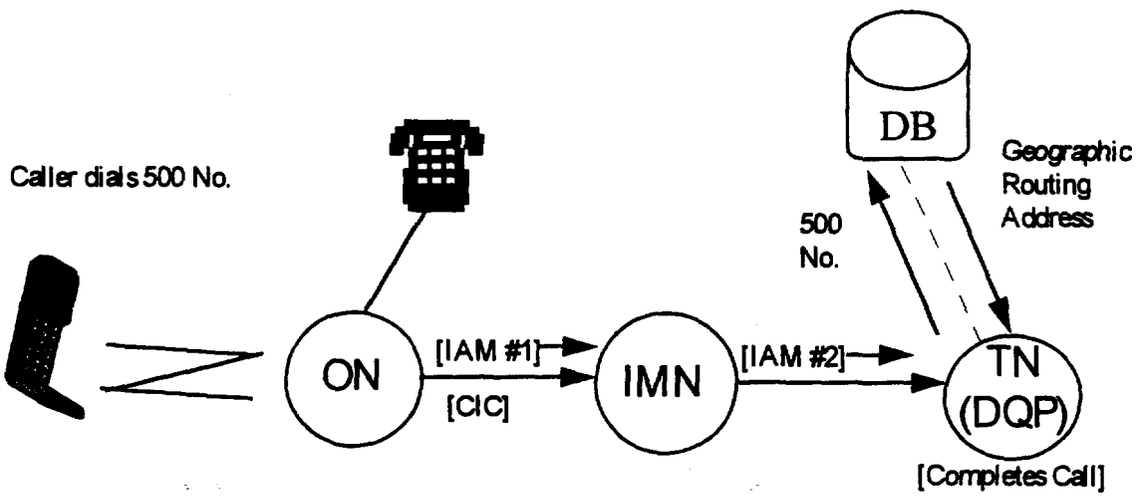
Table 7.3.9

Originating Network	Intermediate Network	Terminating Network
Performs 6-digit translation to identify the CIC	Performs 6-digit translation of the 500 number to a geographic routing address which is the terminating network address of the DQP	Holds call, queries DB for geographic routing address[1]
Routes call to IMN identified by CIC	Routes call to TN using terminating address of the DQP	Routes call to geographic routing address[1]

[1] Geographic routing address may be the actual NANP number of the non-geographic user at their present location or the network address of the terminating switch that will provide additional call processing.

Figure 7.3.9
Terminating Network (TN) is the DQP.
ON routes to the IMN using a CIC.
IMN performs translation using the called number.

Note: IMN performs translation of Called Party Number (e.g., 500 234-XXXX) to geographic number of DQP switch location (e.g., 404 987).



Information Parameter	IAM #1 Example	IAM #2 Example
Called Party Number	500-234-XXXX	404-987-XXXX
Charge Number	212-223-XXXX	
Originating Line Information	00 or 62	
Calling Party Number	212-223-XXXX	212-223-XXXX
Jurisdiction Information	415-234	
Generic Address	Blank Field	500-234-XXXX

Note: The SS7 IAM parameters shown are the minimum set technically required for call routing and/or billing and may be subject to business arrangements.

7.3.10 Terminating Network (TN) is the DQP. ON routes to the IMN using PIC. ON performs translation using the dialed number.

The ON translates the dialed number (e.g., 500 234-XXXX) to the geographic number of the DQP switch location (e.g., 404 987) and routes the call to the IMN using the PIC of the calling party. The information identifying the terminating network node where the DQP is located is then passed on to the IMN. The IMN routes the call to the TN using the geographic number of the DQP switch location (e.g., 404 987). The TN queries the database and retrieves the routing address and routes the call. The assumption in this diagram is that call detail recording for end user billing and identification of the terminating network node where the DQP is located, is performed in the ON. The call detail recording for end user billing could also be performed in the IMN. In addition, based on business arrangements, the call detail recording for end user billing could be performed in the TN.

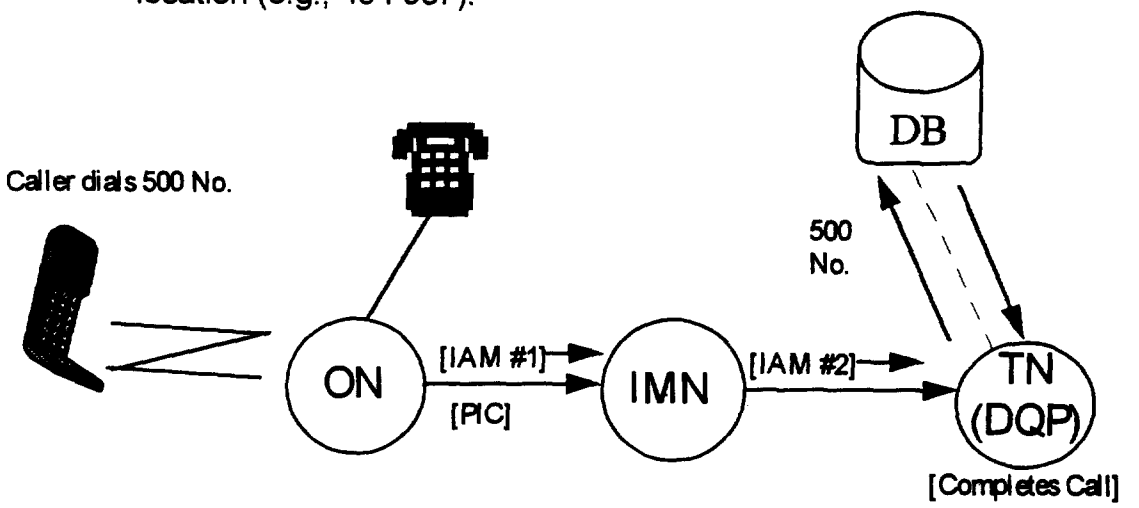
Table 7.3.10

Originating Network	Intermediate Network	Terminating Network
Performs 6-digit translation of the 500 number to a geographic routing address which is the terminating address of the DQP	-	Holds call, queries DB for geographic routing address[1]
Routes call to IMN identified by PIC of the calling party	Routes call to TN using terminating address of the DQP	Completes call

[1] Geographic routing address may be the actual NANP number of the non-geographic user at their present location or the network address of the terminating switch that will provide additional call processing.

Figure 7.3.10
Terminating Network (TN) is the DQP.
ON routes to the IMN using PIC.
ON performs translation using the dialed number.

Note: ON performs translation of Called Party Number (e.g., 500 234-XXXX) to geographic number of DQP switch location (e.g., 404 987).



Information Parameter	IAM #1 Example	IAM #2 Example
Called Party Number	404-987-XXXX	404-987-XXXX
Charge Number	212-223-XXXX	
Originating Line Information	00 or 62	
Calling Party Number	212-223-XXXX	212-223-XXXX
Jurisdiction Information	415-234	
Generic Address	500-234-XXXX	500-234-XXXX

Note: The SS7 IAM parameters shown are the minimum set technically required for call routing and/or billing and may be subject to business arrangements.

7.3.11 Terminating Network (TN) is the DQP. ON routes to the IMN using the CIC. ON performs translation using the dialed number.

The ON translates the Dialed Number (e.g., 500 234-XXXX) to the geographic number of the DQP switch location (e.g., 404 987), then routes the call to the IMN using the CIC associated with the non-geographic number. The information identifying the terminating network node where the DQP is located is then passed on to the IMN. The IMN routes the call to the TN using the geographic number of the DQP switch location. The TN queries the database and retrieves the routing address and routes the call. The assumption in this diagram is that call detail recording for end user billing and identification of the terminating network node where the DQP is located, is performed in the ON. The call detail recording for end user billing could also be performed in the IMN. In addition, based on business arrangements, the call detail recording for end user billing could be performed in the TN.

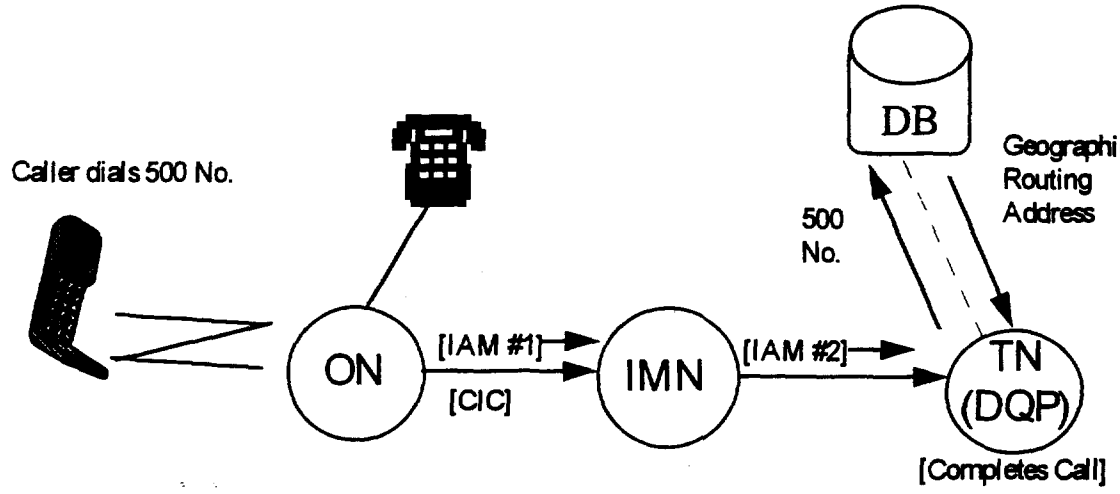
Table 7.3.11

Originating Network	Intermediate Network	Terminating Network
Performs 6-digit translation of the 500 number to a geographic routing address which is the terminating address of the DQP and identifies the CIC	—	Holds call, queries DB for geographic routing address[1]
Routes call to IMN identified by CIC	Routes call to TN using terminating address of the DQP	Completes call

[1] Geographic routing address may be the actual NANP number of the non-geographic user at their present location or the network address of the terminating switch that will provide additional call processing.

Figure 7.3.11
Terminating Network (TN) is the DQP.
ON routes to the IMN using the CIC.
ON performs translation using the dialed number.

Note: ON performs translation on Dialed Number (e.g., 500 234-XXXX) to geographic number of DQP switch location (e.g., 404 987).



Information Parameter	IAM #1 Example	IAM #2 Example
Called Party Number	404-987-0000	404-987-0000
Charge Number	212-223-XXXX	
Originating Line Information	00 or 62	
Calling Party Number	212-223-XXXX	212-223-XXXX
Jurisdiction Information	415-234	
Generic Address	500-234-XXXX	500-234-XXXX

Note: The SS7 IAM parameters shown are the minimum set technically required for call routing and/or billing and may be subject to business arrangements.

8. 0 Rating and Routing Support System Considerations

A detailed analysis of rating and routing support system considerations was not conducted.